

What Is Claimed Is

1. A process for hydroconverting a heavy hydrocarbon chargestock, which comprises the steps of feeding in an upward way a mixture of a homogeneous catalyst, a heavy hydrocarbon chargestock and hydrogen which is pre-heated to a required temperature into a reactor to carry out the hydrocracking reaction, and introducing a solid powder at the position 1/4 to 3/4 of the total length of the reactor from the bottom so as to adsorb the macromolecules of residue formed during the reaction and carry them out of the reactor.

2. The process according to claim 1, wherein said solid powder meets the following requirements: the pore diameter is no less than 10 nm; at least 50% of the particles have diameters of less than 45 μ m.

3. The process according to claim 2, wherein said solid powder meet the following requirements: the pore diameter is no less than 15 nm; at least 50% of the particles have diameters of less than 10 μ m.

4. The process according to claim 1, wherein the amount of said solid powder added is 0.01-4.0% based on the total weight of the heavy hydrocarbon chargestock fed into the reactor.

5. The process according to claim 1, wherein said solid powder comprises a solid catalyst and/or a solid additive.

6. The process according to claim 5, wherein said solid catalyst is Co, Mo, Ni, Zn, K, and/or Fe catalyst supported on a carrier such as alumina, silica-alumina, activated carbon, or amorphous aluminum silicate.

7. The process according to claim 5, wherein said solid additive is a solid particle that is less active or inert for hydrogenation.

8. The process according to claim 7, wherein said solid additive is a brown coal powder, activated carbon, alumina powder, the coke product of the coker, and/or the coke product of the suspension bed itself.

9. The process according to claim 1, wherein said solid powder is carried into the reactor with a hydrocarbon carrier oil.

10. The process according to claim 9, wherein said hydrocarbon carrier oil comprises the unconverted oil in the oil formed in the suspension bed, coker gatch, deasphalted oil, and/or poor quality recycle oil.

11. The process according to claim 9, wherein additional homogeneous catalyst is fed together with the feeding of the hydrocarbon carrier oil.

12. The process according to claim 1, wherein the conditions for hydrocracking reaction in said reactor are: temperature 300-600° C, mean liquid hourly volume space velocity 0.1-2 h⁻¹, hydrogen/oil volume ratio 100-2000, pressure 6.0-20 MPa.

13. The process according to claim 1, wherein the conditions for hydrocracking reaction in said reactor are: temperature of 400-500°C, mean liquid hourly volume space velocity of 0.3-1.5 h⁻¹, hydrogen/oil volume ratio of 300-1500, pressure of 8.0-15 MPa.

14. The process according to claim 1, wherein said homogeneous catalyst is one or more selected from the group consisting of oil soluble catalysts and water soluble catalysts, the amount of which is 0.01-1.0% based on the total weight of the heavy hydrocarbon chargestock fed into the reactor.

15. The process according to claim 1, wherein the amount of said homogeneous catalyst is 0.01-0.1% based on the total weight of said heavy hydrocarbon chargestock fed into the reactor.

16. The process according to claim 1, wherein said homogeneous catalyst is a water soluble catalyst.